Multi-task learning for Natural Language Processing

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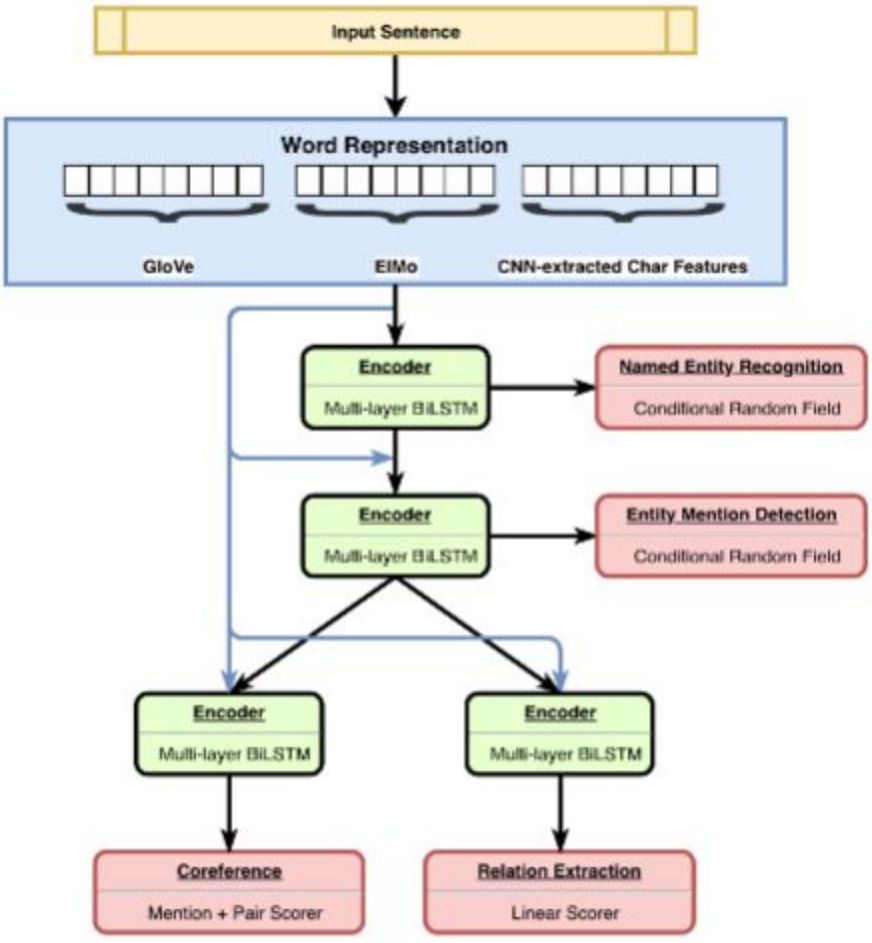
Abstract

This project is about applying multi task learning to the field of Natural Language Processing to solve related tasks like Named Entity Recognition, Entity Mention Detection, Named Relation and Coreference Resolution, by leveraging the relationship between them. The proposed model consists of a hierarchy between the layers with lower levels solving simple tasks and there on adding complex tasks using word embeddings, encoders and task specific layers. The final outcome can be demonstrated with a web application that takes a sentence as input and outputs the result of these NLP tasks.

Architecture



Data Source

Two datasets are used for building the model. The first is the OntoNotes 5.0 for named entity recognition and the second OntoNotes 5.0 is used for CR, EMD and RE.

Input

The input to the application is a sentence on which the NLP tasks have to be applied.

Output

The output of the project is results from the four tasks namely:

1. Entities recognized like person, object, location and so on from Named Entity Recognition
2. Entity mentions like PER, GPE, ORG, FAC, LOC, WEA and VEH from EMD
3. Semantic relation between the items from RE
4. Coreferent spans and cluster of entities

Roles and Responsibilities

Literature review	Rimzim/Vijaylaxmi
Data Preprocessing	Gowri/Aditya
Architecture study	Rimzim/Vijaylaxmi
Model training	Gowri/Aditya
Ablation Study	Gowri/Aditya
Evaluation Metrics	Rimzim/Vijaylaxmi
Visualization	Team

References:

1. A Hierarchical Multi-task Approach for Learning Embeddings from Semantic Tasks.Victor Sanh, Thomas Wolf, Sebastian Ruder. https://arxiv.org/abs/1811.06031